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INCIDENCE OF OSSICULAR CHAIN PATHOLOGY IN TUBOTYMPANIC TYPE OF C.S.O.M

S. K. Kashyap¹, Bhoopendra Singh², J. P. Purohit³, Chandrabhan⁴, Ajay Pratap Singh⁵, Mohd. Azeem⁶

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ABSTRACT: This study was conducted to determine the frequency of ossicular chain pathology in case of CSOM (Tubotympanic type). 100 cases of CSOM (Tubotympanic type) were admitted in E.N.T. department for surgery. Per-operative we found ossicular chain erosion as well as tympanosclerosis of ossicles. In our study we found long process and lenticular process are the most susceptible for erosion and malleo incudal joint more commonly involved by the tympanosclerosis.

KEYWORDS: C.S.O.M. (Tubotympanic type), Ossicular Erosion.

INTRODUCTION: The function of the middle ear is to transmit the sound pressure from air of external ear to the fluid of internal ear. This is accomplished by tympanic membrane and ossicular chain composed of malleus, incus and stapes. Chronic suppurative otitis media is defined as a chronic infection of the mucosa lining the middle ear cleft.

There are Two Types of Chronic Suppurative Otitis Media:

1. Tubotympanic.
2. Atticoantral.

Tubotympanic disease has minimal risk of serious complications as compared to atticoantral. This is usually presented with permanent perforation of tympanic membrane along with hearing loss and sometimes chronic mastoiditis.

Ossicular chain pathology occurs in both cases with or without cholesteatoma and more prevalent in cholesteatoma. It is usually caused by the necrosis of ossicles and tympanosclerosis of ossicular joints. The necrosis of the ossicle is caused by inflammation and hyperemia of active mucosal disease. The long process of incus and stapes supra structure are part of ossicular chain which is commonly affected due to the delicate structure rather than poor blood supply.

Tympanosclerosis is an end process of healing affecting the tympanic membrane and also ossicular joints rather than ossicles and leads to fixation of ossicular chain.

In 1971, Austin classified ossicular chain defects into four categories depending (Table I) upon presence or absence of malleus handle and the presence or absence of stapes suprastructure. Later on two more categories were added.

ORIGINAL ARTICLE

Modified Austin's Classification:

Category	Ossicular Defect
Group-A	Malleus handle intact & stapes intact, incus and head of malleus absent.
Group-B	Stapes present, Malleus and incus absent.
Group-C	Malleus handle and stapes footplate present, Incus, Malleus head and stapes supra structure absent.
Group-D	Malleus, Incus and stapes suprastructure absent, Stapes foot plate present.
Group-E	Isolated loss of malleus handle.
Group-F	Isolated loss of stapes suprastructure.

METHOD AND MATERIAL: The present study titled "Incidence of ossicular chain pathology in tubotympanic type of CSOM" conducted in the Department of E.N.T., M.L.B. Medical College, Jhansi, U. P. between July 2006 to June 2014.

All the patient attended the Department of E.N.T. with history of ear discharge, ear pain & hearing loss more than 3 months of duration first underwent detailed history taking and examination then followed by otoendoscopy as well as E.U.M (Examination under Microscope) to establish a diagnosis of tubotympanic/atticoantral disease. Patients with tubotympanic type of CSOM were included in this study.

These patients underwent various investigations like X-ray mastoid-Towne's view to know the status of mastoid, pure tone audiometry to know the type and degree of hearing loss. Other investigations like CBC, HbsAg, HIV- screenings were done.

Patients with otosclerosis, unsafe CSOM and previous history of surgery were excluded. Intra operative middle ear findings including the ossicular chain erosion based on modified Austin's classification of ossicular chain erosion and ossicular joint involvement by the tympanosclerosis were noted. These ossicular chain pathologies were treated accordingly.

RESULT: This study included 100 patients, out of which 30 were males and 70 were female (Chart-I). All the patients were in the range of 10-60 years of age. The median age group was 11-20 yrs. Maximum number of patients was in the age of 11-30 years, which is 65 (Chart-II).

In this study, 76(76%) patients were found to have normal ossicular chain and 24(24%) were having ossicular pathology (Chart-III). These patients with ossicular pathology were classified into two categories: Ossicular necrosis was found in 18 cases, and tympanosclerosis of the ossicles in 6 cases (Chart-IV).

Out of 18 patients with ossicular necrosis, commonest ossicle involved was incus. The Isolated long process of incus was involved in 14 cases (77.77%) (Figure IV) and lenticular process involvement was found in 3 cases (16.66%) (Figure-V & Chart-V). Hence in group A 17 cases (Group A-94.44%) were found. 1 patient was having erosion of the long process of incus as well as stapes supra structure (Group C- 5.55%) (Table 1).

ORIGINAL ARTICLE

Out of 6 patients with tympanosclerosis, malleo-incudal joint was involved in 4 cases (66.66%) and incudostapedial joint was involved in 2 cases (33.33%) (Table II).

DISCUSSION: The tubotympanic type of CSOM usually present with perforation of tympanic membrane with normal ossicular chain. The delicate ossicle with poor blood supply is most susceptible to be eroded by middle ear disease like csom both in atticoantral as well as tubotympanic type as reported by various authors and in our study too.

Thomsen and others.^[1] reported that bone erosion in chronic otitis media was more prevalent when cholesteatoma was present, but it still occurred in absence of cholesteatoma. Mathur et al.^[2] in 1991 observed erosion of incus in 22% of cases and Quarranta et al.^[3] in 1995, reported same in 27% cases while in our study it found to be 18% of the cases in which we found the erosion of various ossicles.

Austin classification of ossicular chain erosion was modified into six categories as followed in present study.^[4] Swan et al.^[5] described erosion of incus is the most common ossicular pathology and in middle ear diseases, also reported by Varshney et al.^[6] in 2010. In present study we found erosion of incus in all 18 % of cases.

Rout MR et al.^[7] in 2014 reported ossicular necrosis in 19% cases and ossicular involvement in 37% cases and G.S.N. Murthy et al.^[8] found ossicular necrosis only in 8% cases of CSOM. In present study we found that ossicular chain pathology was present in 24% of the cases, 18% cases were having the various type of ossicular necrosis and 6% having tympanosclerosis involving the various ossicular joints.

In our study, 100 cases of CSOM tubotympanic type underwent operative procedure in which we found ossicular pathology in 24 % cases. 18% cases were having ossicular erosion and 6 % cases tympanosclerosis. 14 % cases were having erosion of long process of incus and 3% isolated lenticular process in 3% of cases. There was 1 case of erosion of supra structure of stapes and long process of incus. In 6 cases tympanosclerosis was present, incudo malleolar joint was involved in 4 cases and incudo stapedial joint was involved in 2 cases.

Tympanosclerosis usually involve the ossicular joint but it may also involve the other part of tympanic cavity like ossicle, round window niche, oval window,^[9] stapes footplate and leads to fixation of ossicles causing hearing loss.^[10]

So, from the present study it was found that ossicular chain pathology may also be encountered in case of tubotympanic type of CSOM still it is less common as compared to the cholesteatoma. The long process of incus was found to be most susceptible for erosion.

The delicate ossicles with poor blood supply are susceptible for erosion as compared to other strong ossicles by disease process.

CONCLUSION: The ossicular chain pathology is more common features of cholesteatoma but it may still encounter in tubotympanic disease. As reported by present study 24% cases were found to have ossicular chain pathology in tubotympanic type of CSOM. The long process of incus was more commonly involved because it is delicate structure and erosion of ossicular chain causes the hearing loss.

All patients of CSOM with tubotympanic disease should be checked for ossicular chain continuity and movement of all ossicles to ruled out any ossicular erosion or tympanosclerosis involving the ossicular joints.

ORIGINAL ARTICLE

Type of Ossicular Involvement	No. of pts with Ossicular Necrosis
Isolated loss of Long process of incus	14
Isolated loss of lenticular process of incus	3
Group A	17
Group B	0
Group C	1
Group D	0
Group E	0
Group F	0

Table 1: Type of Ossicles Involved in Ossicular Necrosis Patient

Type of Joint Involvement in Tympanosclerosis	Number of Patient
Malleoincudal Joint	4
Incudostapedial Joint	2

Table 2: Middle Ear Joints Involved in Tympanosclerosis Patient

Chart I: Shows Sex Ratio of Patients

Chart II: Shows Sex Ratio in Various Age Groups

Chart III: Shows % of Normal and Ossicular Pathology

Chart IV: Shows % of Types of Ossicular Pathology

Chart V: Shows Ratio of Ossicular Erosion

Figure I: Small Central Perforation

Figure II: Normal Ossicular Chain

Figure III: Large Central Perforation

Figure IV: Long Process of Incus is Eroded

Figure V: Lenticular Process of Incus is Eroded

Figure VI: Temporal Fascia Graft in Situ

REFERENCES:

1. Thomsen 1, Bretlau P, Jorgensen MB. Bone resorption in chronic otitis media: The role of cholesteatoma, a must or an adjunct. Clin Otolaryngol 1981; 6:179.
2. Mathur NN, Kakar P, Sing T, Sawhney KL. Ossicular pathology in unsafe chronic suppurative otitis media. Indian J Otolaryngo11991; 43:9E12.
3. Quaranta A, Bartoli R, Lozupon E, Resta L, Luranto S. Cholesteatoma in children. Histopathologic findings in middle ear ossicles. J Otolaryngol Relat Spec 1995; 57:296E8.
4. In: Frootko NJ, editor. Reconstruction of middle ear, Scott'/Brown's Otolaryngology, 6th ed. Oxford: ButterworthEHeinemann 1997; 3:11:2-3.
5. Swan IR, Canter R, William Mc K. Chronic otitis media. ScottEBrown's Otolaryngology, Head and neck surgery, 7th ed., vol. 3. London: Edward Arnold (publisher's) ltd, Michael Gleeson editor; 2008. p. 3420123.
6. Varshney S, Nangia A, Bist SS, Singh RK, Gupta N, Bhagat S.Ossicular chain status in chronic suppurative otitis media in adults. Indian J Otolarymqol Head Neck Surg 2010; 62; 621.
7. Rout MR, Das P, Mohanty D, Rao V, Susritha K, Jyothi BE. Ossicular chain defects in safe type of chronic suppurative otitis media. Indian J Otol 2014; 20:102-5.

ORIGINAL ARTICLE

8. Dr. G. S. N. Murthy, a Dr. R. Bhimeshwar, a Dr. M. Veera Kumar, a Dr. S. UdayaChanukya* Mastoid, Middle Ear and Ossicular Pathology in CSOM with Central Perforation and Role of Cortical Mastoidectomy in the Management/Vol- 4/ISSUE-1/ORL- 28181314 /Pg. 1-9.
9. Hoky, Tsai SM, Chai CY Wang HM: Clinical analysis of tubotympanic tympanosclerosis: Etiology, ossicular chain finding and hearing result of surgery. Acta Otolaryngology, 2010 March: 130(3); 370-4.
10. Tsuzuki K, Yanagihara N, Hinohira Y, Sakagami M: Tympanosclerosis involving the ossicular chain: Mobility of stapes in association with hearing loss. Acta. Otolaryngology 2006 Oct. 126(10): 1046-52.

AUTHORS:

1. S. K. Kashyap
2. Bhoopendra Singh
3. J. P. Purohit
4. Chandrabhan
5. Ajay Pratap Singh
6. Mohd. Azeem

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of ENT, M.L.B. Medical College, Jhansi.
2. Senior Resident, Department of ENT, M.L.B. Medical College, Jhansi.
3. Professor, Department of ENT, M.L.B. Medical College, Jhansi.
4. Junior Resident, Department of ENT, M.L.B. Medical College, Jhansi.

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5. Junior Resident, Department of ENT, M.L.B. Medical College, Jhansi.
6. Junior Resident, Department of ENT, M.L.B. Medical College, Jhansi.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. S. K. Kashyap,
Associate Professor,
Flat No. PR-19,
M.L.B. Medical College,
Jhansi, Uttar Pradesh.
E-mail: sushiled20@gmail.com

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